

Grouse Meadows, LeConte Cañon, Aug. 13, 1921. Both of these stations are in the southern Sierra Nevada.

GAULTHERIA OVATIFOLIA A. Gray. Oregon Spicy Wintergreen. *Gaultheria ovatifolia* A. Gray. Proc. Amer. Acad. 19: 84. 1883.

Low shrub with procumbent stems and erect or ascending branches, seldom over 15 cm. high, the branchlets, petioles and calyx pubescent with loosely spreading hairs. Leaves ovate to broadly ovate, the larger 20-25 mm. long, acute at apex, abruptly rounded or subcordate at base, distinctly serrulate; flowers solitary in the leaf axils, on short bracted peduncles; calyx 3 mm. high, the lobes exceeding the tube, acute; corolla campanulate, 3.5 mm. long, white; berry globose 4-5 mm. in diameter, scarlet, spicy-flavored.

This species inhabits the coniferous forests of the Humid Transition and Canadian Life zones. The general geographical distribution extends from British Columbia to northern Idaho and southward on the Pacific Slope to the Siskiyou Mountains of southern Oregon and northern California. The following collections from California have been examined: head of Redwood Creek, Humboldt County, *Chesnut & Drew*, Aug. 6, 1888; Horse Mountain, Humboldt County, *J. P. Tracy* 7670; Bartlett Trail to Preston Peak, Del Norte County, *Dudley*, July 6, 1899; Bear Wallows, 2 miles north of Sanger Peak, alt. 4500 feet, *Kildale* 8790; Klamath Range, near Preston Peak, *Jepson* 2878. A fragmentary specimen with only a few immature leaves, collected by C. B. Bradley at Scales Diggins, near Poverty Flat, Sierra County, seems referable to this species; but the material is too incomplete to make a definite determination.

TERATOLOGY IN WILLOWS

CARLETON R. BALL

The willows, in common with other plants, afford numerous instances of abnormal or teratological morphology. This may be shown by stems, leaves, aments, or flowers. Brief mention of a few may interest both professional and amateur botanists to observe others.

DIAMOND WILLOWS. The term is applied to stems in which the scars left by the atrophy of branchlets do not become overgrown by new tissue but remain and increase in size with the enlargement of the stem. In the more perfect specimens the resulting diamond-shaped depressions are regularly arranged on the stem according to the normal phyllotaxy. Some species of the American section *Cordatae*, especially *Salix lutea* of the Rocky Mountains and westward, are known to exhibit this phenomenon. In 1931 Professor W. A. Setchell of the University of California discovered that *Salix alaxensis*, the widely distributed tree willow of Alaska, also forms the diamond scars. He has presented to the writer a most beautiful cane made from a stem obtained among the Indians at Gulkana, and has given to the Department of Botany a small log section from a larger trunk.

LEAF VENATION. In *Salix* leaves the midvein normally is unbranched, but occasionally divided midveins are observed. More noteworthy and more difficult of explanation are occasional extra veins which seem to bear no regular relation to the midvein or the primaries but to cut across both at varying angles. These usually are visible only on the under surface of the leaf. They have been noted in a few species, especially *Salix subcoerulea* of the western United States.

BRANCHING AMENTS. These occur but rarely. The branch usually arises from the basal third of the rachis. These should not be confused with multiple aments. Several species of the longleaf or sandbar willows, section *Longifoliae*, commonly produce from 2 to 4 aments at the end of a single peduncle or leafy shoot. Although crowded closely together, these aments are separate and distinct.

HERMAPHRODITE WILLOWS. Willows normally are dioecious but plants with aments containing flowers of both sexes are not uncommon. Sometimes the flowers are perfect, that is, having stamens and a pistil in the same flower. More frequently the flowers are unisexual but those of the two sexes are intermingled. In such cases staminate flowers usually predominate in the proximal or lower part of the ament and pistillate flowers in the distal or outer portion. Very commonly, and perhaps as a result of inter-specific hybridization, the flowers of both sexes will be monstrously deformed in a variety of ways and degrees. There is an extensive literature on willow hermaphroditism.

PROLONGED AMENT RACHIS. A rare and noteworthy teratological expression has just been brought to notice by Joseph P. Tracy, the veteran botanist of Eureka, Humboldt County, California. On a specimen of the newly described *S. Scouleriana* var. *coetanea* Ball collected by him on South Fork Mountain in Trinity County, California, in July, 1933, two pistillate aments show a prolongation of the ament rachis into a leaf-bearing branchlet. In one ament the process has just begun, a single rudimentary leaf appearing at the apex of the rachis among the terminal capsules. In the other the rachis has elongated into a branchlet about 1 cm. long and bearing one nearly orbicular leaf about 5 mm. long and four nearly normal but just expanding, narrowly obovate leaves from 1 to 1.3 cm. long. Their margins are rather closely sinuous-serrulate, a character not uncommon in the species but relatively absent in similar leaves of normal branchlets on this specimen. The branchlet bearing these leaves is somewhat swollen at its union with the tip of the rachis but it shows no sign of a joint or abscission layer such as occurs at the junction of seasonal shoots and the older stem. It is densely white pubescent like the rachis rather than thinly so like the normal branchlets. Its small leaves also are slightly more pubescent than those of similar size on normal branchlets. There is a slight possibility that the swelling represents an insect attack which stimulated vegetative growth without brachyism and consequent gall formation, but this seems hardly likely, especially as galls have never been observed by the writer at the tips of aments or indeed on aments at all.

University of California, Berkeley, December 4, 1933.